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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

*Group:* 2831  
*Confirmation No.:* 7528  
*Application No.:* 09/982,154  
*Invention:* HIGH VOLTAGE CABLE  
*Applicant:* Brian E. Gorrell  
*Filed:* October 18, 2001  
*Attorney*  
*Docket:* 3030-69081  
*Examiner:* William H. Mayo III

Certificate Under 37 CFR 1.8(a)  
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450  
on January 19, 2004  
(Signature)  
Kim Tyree  
(Printed Name)

APPEAL BRIEF

Mail Stop Appeal Brief  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This appeal brief is submitted in triplicate in furtherance of the appeal taken November 20, 2003. The Commissioner is hereby authorized to charge the \$330 fee for filing this appeal brief, as well as any other fees which may be necessary to constitute this a timely filed appeal brief, to Appellant's undersigned counsel's deposit account 10-0435, with reference to file number 3030-69081. A duplicate copy of this authorization is enclosed for this purpose.

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**Real Party In Interest**

The real party in interest is Illinois Tool Works Inc., by virtue of an assignment recorded October 18, 2001 in the records of the Patent and Trademark Office on patent record reel 012282, beginning at frame 0187.

### **Related Appeals and Interferences**

There are no related appeals or interferences of which the undersigned is aware.

### **Status of Claims**

Claims 1-20, all of the claims in this application, are finally rejected. The final rejections of all of claims 1-20 are appealed.

### **Status of Amendments**

No amendments were filed subsequent to final rejection.

### **Summary of the Invention**

The invention may best be understood by referring to the appealed claims 1-20, annotated with parenthetical reference numbers and related notes from the detailed description.

With reference to claim 1, the invention is a high voltage cable (10) including a fiber core (20), a first layer (22) of an electrically relatively non-insulative polymer, a second layer (24) of an electrically relatively non-conductive polymer, a third layer (26) of an electrically relatively non-insulative polymer, a fourth layer (28) including a metal braid shield, and a fifth layer (30) including a relatively solvent- and abrasive-resistant polymer jacket.

With reference to claim 2, the invention is the cable (10) of claim 1 wherein the fiber core (20) includes a stranded fiber polyester core (page 4, lines 5-6).

With reference to claim 3, the invention is the cable (10) of claim 2 wherein the fiber core (20) is impregnated (page 4, lines 6-7) to increase its bulk conductivity (page 4, lines 7-8).

With reference to claim 4, the invention is the cable (10) of claim 3 wherein the fiber core (20) is impregnated with carbon black (page 4, lines 6-7).

With reference to claim 5, the invention is the cable (10) of claim 1 wherein the fiber core (20) is impregnated (page 4, lines 6-7) to increase its bulk conductivity (page 4, lines 7-8).

With reference to claim 6, the invention is the cable (10) of claim 5 wherein the fiber core (20) is impregnated with carbon black (page 4, lines 6-7).

With reference to claim 7, the invention is the cable (10) of claim 1 wherein the first layer (22) includes a layer (22) of semiconductive polyethylene (page 4, lines 13-16).

With reference to claim 8, the invention is the cable (10) of claim 7 wherein the layer of semiconductive polyethylene (page 4, lines 13-16) includes a layer of carbon black-loaded polyethylene (page 4, lines 13-16).

With reference to claim 9, the invention is the cable (10) of claim 1 wherein the second layer (24) includes a layer (24) of electrically relatively non-conductive polyethylene (page 4, lines 16-19).

With reference to claim 10, the invention is the cable (10) of claim 9 wherein the layer (24) of electrically relatively non-conductive polyethylene (page 4, lines 16-19) includes a layer of relatively high molecular weight, relatively low density polyethylene (page 4, lines 16-19).

With reference to claim 11, the invention is the cable (10) of claim 1 wherein the third layer (26) includes a layer (26) of electrically relatively non-insulative polyvinyl chloride (page 4, lines 20-21).

With reference to claim 12, the invention is the cable (10) of claim 11 wherein the layer (26) of electrically relatively non-insulative polyvinyl chloride (page 4, lines 20-21) includes a layer (26) of spirally extruded electrically relatively non-insulative polyvinyl chloride (page 4, lines 20-21).

With reference to claim 13, the invention is the cable (10) of claim 1 wherein the third layer (26) includes a layer (26) of spirally extruded electrically relatively non-insulative polymer (page 4, lines 20-21).

With reference to claim 14, the invention is the cable (10) of claim 1 wherein the metal braid shield (28) includes a copper-containing braid shield (page 4, lines 22-23).

With reference to claim 15, the invention is the cable (10) of claim 14 wherein the copper-containing braid shield (28) further contains tin (page 4, lines 22-23).

With reference to claim 16, the invention is the cable (10) of claim 1 wherein the metal braid shield (28) includes a tin-containing braid shield (page 4, lines 22-23).

With reference to claim 17, the invention is the cable (10) of claim 1 wherein the metal braid shield (28) includes a metal braid covering between about 85% and about 100% of the outside surface of the third layer (26) of electrically relatively non-insulative polymer (page 4, lines 22-23).

With reference to claim 18, the invention is the cable (10) of claim 1 wherein the pitch of the braid of the metal braid shield (28) is between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable (page 4, lines 23-25).

With reference to claim 19, the invention is the cable (10) of claim 1 wherein the polymer jacket (30) includes a flexible polyurethane jacket (col. 5, lines 1-2).

With reference to claim 20, the invention is the cable (10) of claim 1 in combination with a high magnitude electrostatic potential supply (12), a device (14) for the electrostatically aided atomization and dispensing of a coating material (16), and a source of the coating material (16) coupled to the device (14). The high voltage cable (10) couples the potential supply (12) to the device (14).

### **Issues**

The issues on appeal are: 1) whether claims 1, 2 and 9-20 would have been 35 U. S. C. § 103 obvious in view of the combination of Hastings U. S. Patent 4,576,827 (hereinafter Hastings '827) and Dinzen U. S. Patent 5,250,755 (hereinafter Dinzen); and, 2) whether claims 3-8 would have been 35 U. S. C. § 103 obvious in view of Hastings '827, Dinzen and Hastings U. S. Patent 4,739,935 (hereinafter Hastings '935).

### **Grouping of Claims**

All of claims 1-20 are believed to be separately patentable, at least for the reasons set forth in the following arguments.

### **Argument**

In the final official action of August 21, 2003 the Examiner rejected claims 1, 2 and 9-20 under 35 U. S. C. § 103. The Examiner relied upon the combination of Hastings '827 and Dinzen to support this rejection.

The Examiner takes the position that Hastings '827 teaches a high voltage cable including a fiber core 200, a first layer 202 of electrically relatively non-insulative polymer, a second layer 204 of an electrically relatively non-conductive polymer, a fourth layer 206 including a metal braid shield, and a fifth layer 210 including a relatively solvent- and abrasion-resistant polymer jacket.

With respect to claim 2, the Examiner takes the position that Hastings '827 teaches that the fiber core 200 includes a stranded fiber polyester core.

With respect to claims 9 and 10, the Examiner takes the position that Hastings

‘827 teaches that the second layer 204 may include a non-conductive layer of low-density polyethylene.

With respect to claim 17, the Examiner takes the position that Hastings ‘827 teaches that the metal braid shield 206 includes a metal braid covering between about (sic -- 85% and) 100% of the outside surface of the second layer 204 of electrically relatively insulative polymer.

With respect to claim 18, the Examiner takes the position that Hastings ‘827 teaches that the fourth layer 206 including a metal braid shield has a pitch.

With respect to claim 19, the Examiner takes the position that Hastings ‘827 teaches that the polymer jacket 210 includes a flexible polyurethane jacket.

With respect to claim 20, the Examiner takes the position that Hastings ‘827 teaches the combination including a high-magnitude potential supply 16a, a spray gun for the electrostatically aided atomization and dispensing of a coating material, a source 4a of the coating material coupled to the spray gun, and the high voltage cable 16 coupled to the potential supply 16a and the spray gun.

The Examiner concedes that Hastings ‘827 does not teach claim 1’s specifically recited third layer of an electrically relatively non-insulative polymer between the second layer of an electrically relatively non-conductive polymer and the fourth layer including a metal braid shield. The Examiner concedes that Hastings ‘827 does not teach claim 11’s specifically recited third layer including a layer of electrically relatively non-insulative polyvinyl chloride. The Examiner concedes that Hastings ‘827 does not teach claims 12 and 13’s specifically recited third layer including a layer of spirally extruded electrically relatively non-insulative polymer. The Examiner concedes that Hastings ‘827 does not teach claim 14’s specifically recited metal braid shield including a copper-containing braid shield. The Examiner concedes that Hastings ‘827 does not teach claim 15’s specifically recited metal braid shield including a copper- and tin-containing braid shield. The Examiner concedes that Hastings ‘827 does not teach claim 16’s specifically recited metal braid shield including a tin-containing braid shield. The Examiner concedes that Hastings ‘827 does not teach claim 17’s specifically recited metal braid shield includes a metal braid covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer. The Examiner concedes that Hastings ‘827 does not teach claim 18’s specifically recited pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.

Specifically with respect to claims 1 and 17, the Examiner relies upon Dinzen to teach a core 1 surrounded by a first layer conductive sleeve 2, a second layer high voltage insulative sleeve 3 surrounding the first layer conductive sleeve 2, a third layer conductive sleeve 4 surrounding the second layer high voltage insulative sleeve 3, a fourth layer of braided wires 5 surrounding the third layer conductive sleeve 4, and an outer casing 6 of PVC surrounding the fourth layer of braided wires 5.

With respect to claims 11 and 12, the Examiner relies upon Dinzen to teach that the third layer of conductive material 4 between the second layer of insulative material 3 and the fourth layer of braided conductive material 5 may be made of a synthetic resin, such as embedded PVC.

With respect to claim 14, the Examiner relies upon Dinzen to teach that the braided shield 5 is made of copper wire.

With respect to claims 1, 14 and 17, the Examiner concludes that it would have been 35 U. S. C. § 103 obvious to modify the cable configuration of Hastings '827 to include a third layer of conductive polymer material extending between the second layer of insulative material and a fourth layer of braided material and copper braided shield as taught by Dinzen because Dinzen teaches that such a configuration is a conventional high voltage cable configuration and provides for carrying high voltages without damaging the cable itself, citing Dinzen, col. 1, lines 7-13.

With respect to claims 12, 13, 15 and 16, the Examiner concludes that it would have been 35 U. S. C. § 103 obvious to modify the cable configuration of Hastings '827 as previously modified by Dinzen to include a layer of spirally wrapped PVC and copper-tin braided shield, citing In re Leshin, 125 USPQ 416.

With respect to claim 18, the Examiner concludes that it would have been 35 U. S. C. § 103 obvious to further modify the cable configuration of Hastings '827 as previously modified by Dinzen to include a braided shield having a pitch between 0° and 20° to a perpendicular to the longitudinal extent of the cable, citing Span-Deck Inc. v. Fab-Con Inc., 215 USPQ 835 (CA 8, 1982).

The Examiner rejected claims 3-8 under 35 U. S. C. § 103. The Examiner relied upon the combination of Hastings '827, Dinzen and Hastings '935 to support this rejection. The Examiner relied upon Hastings '827 and Dinzen as previously noted. The Examiner relies upon Hastings '935 to teach a high voltage cable utilized in a spray system that eliminates the possibility of having corona inducing voids or spaces between the carbon loaded sheath and the outer dielectric layers, thereby eliminating the possibility of cable

failure, citing Hastings '935 col. 2, lines 27-42. The Examiner concedes that the Hastings '827/Dinzen combination neither discloses nor suggests the fiber core being impregnated to increase its conductivity, nor the fiber core being impregnated with carbon black to increase its conductivity.

With respect to claim 3, the Examiner takes the position that Hastings '935 teaches that the fiber core 42 is impregnated to increase its bulk conductivity.

With respect to claim 4, the Examiner takes the position that Hastings '935 teaches that the fiber core 42 is impregnated with carbon black, apparently equating silicon carbide with carbon black.

With respect to claim 5, the Examiner takes the position that Hastings '935 teaches that the fiber core 42 is impregnated to increase its bulk conductivity.

With respect to claim 6, the Examiner takes the position that Hastings '935 teaches that the fiber core 42 is impregnated with carbon black.

With respect to claim 7, the Examiner takes the position that Hastings '935 teaches that the first layer 202 includes a layer of semiconductive polyethylene, citing Hastings '935, col. 14, lines 50-55.

With respect to claim 8, the Examiner takes the position that Hastings '935 teaches that the first layer 44 includes a layer of semiconductive polyethylene that includes a layer of carbon black-loaded polyethylene, citing Hastings '935, col. 4, lines 50-55.

### **Analysis of the References**

The references relied upon by the Examiner describe the following distinct cable structure, starting from the cores of the described structures and working outwardly:

#### **I) (from Hastings '827)**

1) twisted strands 200 of Dacron for strength and Nicalon silicon carbide fiber for electrical conductivity to provide a specific resistivity in the approximately  $10^3$  ohm-cm range (Hastings '827, col. 14, lines 46-48);

2) a relatively highly resistive extruded layer 202 of 13% carbon-filled polypropylene having a resistivity in the approximate range of  $10^7$  -  $10^9$  ohm-cm so that the high voltage gradients that would otherwise tend to occur at the outwardly projecting end 203 of any broken Nicalon silicon carbide filament are markedly reduced in the relatively highly resistive layer 202 (Hastings '827, col. 14, line 48-col. 15, line 4);

3) a dielectric sheath 204 of Alathon 3535 NC10 high molecular

weight, low density polyethylene to insulate the core 200 for high voltage operation (Hastings '827, col. 15, lines 1-21);

- 4) an electrically grounded conductive braid 206 of unspecified material (Hastings '827, col. 15, lines 1-21);
- 5) a lapped layer 208 of polyester sheet material (Hastings '827, col. 15, lines 1-21); and,
- 6) a layer 210 of polyurethane (Hastings '827, col. 15, lines 1-21).

**II) (from Dinzen, col. 4, lines 30-49)**

- 1) an inner conductor 1 having a core in the form of a synthetic plastic string and around it a layer of six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord;
- 2) a conducting sleeve 2 of semiconducting rubber;
- 3) high voltage insulation 3 of ethylene-propylene rubber (EPR);
- 4) a conducting sleeve 4 of semiconducting rubber;
- 5) a conductor 5 of braided copper wires; and,
- 6) a casing 6 of polyvinyl chloride (PVC).

**III) (from Dinzen, col. 4, lines 50-63)**

- 1) a conductor 1 having a core including a copper wire, and around it a layer of six nickel-iron alloy wires;
- 2) a conducting sleeve 2 of semiconducting rubber;
- 3) high voltage insulation 3 of EPR;
- 4) a conducting sleeve 4 of semiconducting rubber;
- 5) a conductor 5 of braided copper wires; and,
- 6) a casing 6 of PVC.

**IV) (from Dinzen, col. 4, lines 50-63 and col. 5, lines 59-62)**

- 1) a cable core 1' having two bare high voltage conductors 7 of Ni-Fe-alloy wires and two insulated heating conductors 8 of Ni-Fe alloy wire with insulation 9, all stranded together to form a cable core;
- 2) a conducting sleeve 2 of semiconducting rubber;
- 3) high voltage insulation 3 of EPR;
- 4) a conductive sleeve 4' of semiconducting coated band;
- 5) a screen braid 5 of copper wires; and,

6) a casing 6 of PVC.

**V) (from Dinzen, col. 5, lines 41-48)**

1) a high voltage conductor 1 including a first heating conductor 10, an insulation 11, a second heating conductor 12, an insulation 13, and a high voltage conductor 14, all of unspecified materials, although it is not unreasonable to assume that the high voltage conductor 14 is constructed from the same material as the high voltage conductor 1 of II-1) above, namely, a synthetic plastic string and around it a layer of 6 stranding elements each including a core wire and a layer of 6 steel wires stranded to form a cord (Dinzen, col. 5, lines 41-48);

- 2) a conducting sleeve 2 of unspecified material;
- 3) high voltage insulation 3 of unspecified material;
- 4) a conducting sleeve of unspecified material;
- 5) a conductor 5 of unspecified material;
- 6) a band 6', presumably semiconductive, of unspecified material; and,
- 7) a casing 6 of unspecified material.

**VI) (from Dinzen, col. 5, lines 55-59)**

1) a conductor having a core provided with two heating conductors 8, 9 and one heat control conductor 15-16, all of unspecified materials;

- 2) a conducting sleeve 17 of unspecified material; and,
- 3) a high voltage conductor 18 of unspecified material.

**VII) (from Hastings '935)**

1) a core 40 of twisted strands of Dacron for strength and Nicalon silicon carbide fiber for electrical conductivity to provide a specific resistivity in the approximately  $10^3$  ohm-cm range (Hastings '935, col. 3, line 55-col. 4, line 3);

2) spirally wound insulative thread or ribbon 42 having a pitch of 3/8 inch and made from nylon, polyurethane, Mylar, Dacron, PET or other polyester (Hastings '935, col. 4, lines 4-47); and,

3) a carbon-loaded polyethylene layer 44 having a resistivity of  $10^6$ - $10^8$  ohm-cm, preferably  $10^7$  ohm-cm (Hastings '935, col. 4, lines 52-62).

4) a dielectric sheath 46 constructed from a material which will blend or chemically cross-link with the material of the sheath 44, with the material of sheath 46

having a resistivity in the range of  $10^{14}$ - $10^{16}$  ohm-cm. Sheath 46 can be constructed from, for example, the same polymer, as sheath 44, for example, polyethylene or polypropylene, or the mating surfaces of sheaths 44, 46 can be melted into each other, ultrasonically welded, adhered, or wetted to compatibilize the materials, etc. Alternatively, both sheaths 44 and 46 can be fabricated from different but compatible co-polymers such as ethylene propylene copolymer and ethylene propylene diene terpolymers, or from two different materials which are reactive with each other to form a chemical bond or crosslink at their interface, or, if sheaths 44 and 46 are formed of incompatible materials, a compatibilizing layer can be incorporated between the two layers to avoid any interfacial void;

- 5) an electrically grounded conductive braid layer or sheath 50;
- 6) a layer 52 of Mylar brand polyester ribbon wrapped to provide a 50% overlap;
- 7) a layer 54 of polyurethane for abrasion resistance.

From these embodiments, Appellant counts six different choices for the core of the cable, three different choices for the first layer, four different choices for the second layer, five different choices for the third layer, five different choices for the fourth layer, and four different choices for the fifth layer. These choices include:

**for the core: I-1) and VII-1)** twisted strands of Dacron polyester and Nicalon silicon carbide fiber providing a specific resistivity in the approximately  $10^3$  ohm-cm range; **II-1)** an inner conductor having a core in the form of a synthetic plastic string and around it a layer of six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord; **III-1)** a conductor having a core including a copper wire, and around it a layer of six nickel-iron alloy wires; **IV-1)** a cable core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together to form the cable core; **V-1)** a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor, all of unspecified material; and, **VI-1)** a conductor having a core provided with two heating conductors and one heat control conductor, all of unspecified material;

**for the first layer: I-2)** an extruded layer of carbon-filled polypropylene having a resistivity in the approximate range of  $10^7$  - $10^9$  ohm-cm; **II-2 to VI-2)** a conducting sleeve of semiconducting rubber; and, **VII-2)** spirally wound insulative thread or ribbon having a pitch of 3/8 inch and made from nylon, polyurethane, Mylar, Dacron, PET or other

polyester;

**for the second layer:** **I-3)** a dielectric sheath; **II-3) to V-3)** high voltage insulation; **VI-3)** a high voltage conductor; and **VII-3)** a carbon-loaded polyethylene layer having a resistivity of  $10^6$ - $10^8$  ohm-cm;

**for the third layer:** **I-4)** an electrically grounded conductive braid of unspecified material; **II-4) and III-4)** a conducting sleeve of semiconducting rubber; **IV-4)** a conducting sleeve of semiconducting coated band; **V-4)** a conducting sleeve of unspecified material; and **VII-4)** a dielectric sheath constructed from a material which will blend or chemically cross-link with the material of the sheath of VII-3), with the material of sheath of VII-4) having a resistivity in the range of  $10^{14}$ - $10^{16}$  ohm-cm. The sheaths VII-3) and VII-4) can be constructed from the same polymer, or the mating surfaces of sheaths VII-3) and VII-4) can be melted into each other, ultrasonically welded, adhered, or wetted to compatibilize the materials, etc., or, the sheaths VII-3) and VII-4) can be fabricated from different but compatible co-polymers such as ethylene propylene copolymer and ethylene propylene diene terpolymers, or from two different materials which are reactive with each other to form a chemical bond or crosslink at their interface, or, if sheaths VII-3) and VII-4) are formed of incompatible materials, a compatibilizing layer can be incorporated between the two layers to avoid any interfacial void;

**for the fourth layer:** **I-5)** a lapped layer of polyester sheet material; **II-5)** and **III-5)** a conductor of braided copper wires; **IV-5)** a screen braid of copper wires; **V-5)** a conductor; and, **VII-5)** an electrically grounded conductive braid layer or sheath; and,

**for the fifth layer:** **I-6)** a layer of polyurethane; **II-6) to IV-6)** a casing of PVC; **V-6)** a casing; and **VII-6)** a layer of Mylar brand polyester ribbon wrapped to provide a 50% overlap.

By Appellant's calculation, these choices provide seventy-two hundred different high voltage cable configurations that can be made up from among these choices (six different core choices, three different first layer choices, four different second layer choices, five different third layer choices, five different fourth layer choices, and four different fifth layer choices).

The question thus becomes, "How would the person of ordinary skill in the art have known which of the materials appearing in these various listings to pick for which layers?" The answer, Appellant submits, is that the person of ordinary skill in the art

wouldn't have known at the time Appellant made the invention which is the subject of the claims on appeal, which of the materials appearing in these various listings to pick for which layers.

The problem with the Examiner's position that substituting specific isolated layers of specific materials from Dinzen and specific isolated layers of specific materials from Hastings '935 for specific isolated layers of specific materials of Hastings '827 is that the person of ordinary skill would have needed Appellant's disclosure to choose Appellant's combination. It is well settled that an inventor's own disclosure cannot be used as a guide to combine isolated elements from the prior art to establish the 35 U. S. C. § 103 obviousness of the inventor's claims.

The position and material makeup of each layer of Hastings '827 exists in the combination of Hastings '827 to achieve a unique function in the combination of Hastings '827. The position and material makeup of each layer of Dinzen exists in the combination of Dinzen to achieve a unique function in the combination of Dinzen. The position and material makeup of each layer of Hastings '935 exists in the combination of Hastings '935 to achieve a unique function in the combination of Hastings '935. To argue that replacing the material used in a layer of one of these references with a material used in a different layer of another, or between two layers found in another, is less a reliable prediction of the outcome of such an experiment than it is a guess; less evidence of 35 U. S. C. § 103 obviousness and more a matter for speculation.

Some motivation must be found in the prior art of record for constructing the cable of the claims. However, no motivation is found where motivation must be to make out a *prima facie* case of 35 U.S.C. §103 obviousness. That is, no motivation is found in the prior art of record. Rather, the only source for the motivation to construct the cable of Appellant's claims is Appellant's claims themselves. Using the claims as the source for the motivation to construct the claimed cable does not make out a *prima facie* case of 35 U.S.C. §103 obviousness. Quite the contrary, Appellant submits. It makes out a *prima facie* case of 35 U.S.C. §103 unobviousness. It is well-settled that

The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time . . . . That which may be made clear and thus 'obvious' to a court, with the invention fully diagrammed and aided . . . by [experts in the field], may have been a breakthrough of substantial dimension when first unveiled.

Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543,

547-548 (Fed. Cir. 1985). Confer Uniroyal Inc. v. Rudkin-Wiley Corp., 5 USPQ 2d 1434, 1438.

The PTO has the burden under section 103 to establish a *prima facie* case of obviousness (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984)). It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references (citing In re Lalu, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1984); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 297 n.24, 227 USPQ 657, 667 n.24 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)). This it has not done. The Board points to nothing in the cited references, either alone or in combination, suggesting or teaching Fine's invention." In re Fine, 5 USPQ 2d 1596, 1598-99 (Fed. Cir. 1988).

From its discussion of the prior art it appears to us that the court, guided by the defendants, treated each reference as teaching one or more of the specific components for use in the Feil system, although the Feil system did not then exist. Thus the court reconstructed the Feil system, using the blueprint of the Feil claims. As is well established, this is legal error (citing Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 774, 218 USPQ 781, 791 (Fed. Cir. 1983), *cert. denied*, 104 S.Ct. 1284, 224 USPQ 520 (1984)).

Interconnect Planning, *supra*. at 548.

Here the Examiner clearly has used Appellants' claims as a blueprint for combining elements of Hastings '827, Dinzen and Hastings '935 to support his position concerning the 35 U.S.C. §103 obviousness of Appellant's claims. As the above-quoted cases make clear, that is not the analysis contemplated by 35 U.S.C. §103.

More is required to make out a *prima facie* case of obviousness under 35 U. S. C. § 103 than simply finding the isolated bits and pieces of the claimed arrangement in the prior art.

When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. See, e.g., McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the Graham factors).

The factual inquiry whether to combine references must be thorough and searching.” Id. It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. See, e.g., Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) (“a showing of a suggestion, teaching, or motivation to combine the prior art references is an ‘essential component of an obviousness holding’”) (quoting C.R. Bard, Inc., v. M3 Systems, Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998)); In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (“Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.”); In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) (“teachings of references can be combined only if there is some suggestion or incentive to do so.”) (emphasis in original) (quoting ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)).

The need for specificity pervades this authority. See, e.g., In re Kotzab, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) (“particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed”); In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) (“even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.”); In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (the examiner can satisfy the burden of showing obviousness of the combination “only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references”).

With respect to Lee’s application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that which Lee described. The examiner’s conclusory statements that “the demonstration mode is just a

programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software” and that “another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial” do not adequately address the issue of motivation to combine. This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to “[use] that which the inventor taught against its teacher.” W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency’s conclusion.

In re Lee, 61 U. S. P. Q. 2d 1430, 1433-1435, (Fed. Cir., 2002).

Appellant submits that the combination relied upon by the Examiner does not meet the requirements recognized by In re Lee to make out a *prima facie* case of 35 U. S. C. § 103 obviousness. Accordingly, Appellant submits that the 35 U. S. C. § 103 rejection of claims 1, 2 and 9-20 is overcome.

### **The Claims Are Separately Patentable**

The claims are separately patentable, and additionally are patentable over 35 U. S. C. § 103 obvious combination of the cited references, for at least the above reasons and the following clear distinctions from the prior art of record indicated in italics.

#### **Claim 1**

Hastings ‘827 describes his third layer as an electrically grounded conductive *braid*. Appellant’s third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings ‘827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant’s fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen’s col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant’s claim 1 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen’s col. 4, lines 50-63) embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant’s claim 1

describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 1 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 1 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 1 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor.* Appellant's claim 1 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 1 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 1 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 1 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

## Claim 2

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 2 describes the core as a stranded fiber *polyester* core. Hastings '827 describes his third layer as an *electrically grounded conductive braid.* Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each*

*including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.*

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.*

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as *a high voltage conductor.* Appellant's claim 2 describes the second layer as including an *electrically relatively non-conductive polymer.*

Hastings '935 describes the first layer as a spirally wound *insulative* thread or ribbon. Appellant's claim 2 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 2 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 2 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

### **Claim 3**

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 3 describes the core as *a stranded fiber polyester core impregnated to increase its bulk conductivity.* Hastings '827 describes his third layer as an *electrically grounded conductive braid.* Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer.* Hastings

‘827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant’s fourth layer is described as a fourth layer including a *metal braid* shield.

Dinzen describes the core of Dinzen’s col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant’s claim 3 describes the core as *a stranded fiber polyester core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen’s col. 4, lines 50-63) embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant’s claim 3 describes the core as *a stranded fiber polyester core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen’s col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant’s claim 3 describes the core as *a stranded fiber polyester core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen’s col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant’s claim 3 describes the core as *a stranded fiber polyester core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen’s col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant’s claim 3 describes the core as *a stranded fiber polyester core impregnated to increase its bulk conductivity*. Dinzen also characterizes the second layer of Dinzen’s col. 5, lines 55-59 embodiment as *a high voltage conductor*. Appellant’s claim 3 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings ‘935 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide*. Appellant’s claim 3 describes the core as *a stranded fiber polyester core impregnated to increase its bulk conductivity*. Hastings ‘935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant’s claim 3 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings ‘935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant’s claim 3 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer.

Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 3 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. All emphasis Appellant's.

#### **Claim 4**

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*. Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 4 describes the core as *a stranded fiber polyester core*

*impregnated with carbon black to increase its bulk conductivity.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as *a high voltage conductor.* Appellant's claim 4 describes the second layer as including an *electrically relatively non-conductive polymer.*

Hastings '935 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity.* Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 4 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 4 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 4 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

### Claim 5

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.* Hastings '827 describes his third layer as an electrically grounded conductive *braid.* Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires.* Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.*

Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity*. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as *a high voltage conductor*. Appellant's claim 5 describes the second layer as including an *electrically relatively non-conductive polymer*.

Hastings '935 describes the core as a core of twisted strands of polyester and *silicon carbide fiber* for electrical conductivity to provide a specific resistivity in the approximately  $10^3$  ohm-cm range. Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity*. Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 5 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of  $10^6$ - $10^8$  ohm-cm, preferably  $10^7$  ohm-cm*. Appellant's claim 5 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 5 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

### **Claim 6**

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide*. Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity*. Hastings '827 describes his third layer as an electrically grounded conductive braid. Appellant's third layer is described as a third layer of an electrically relatively non-insulative polymer. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each*

*including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires.* Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as *a high voltage conductor.* Appellant's claim 6 describes the second layer as including an *electrically relatively non-conductive polymer.*

Hastings '935 describes the core as a core of twisted strands of polyester and *silicon carbide fiber* for electrical conductivity to provide a specific resistivity in the approximately  $10^3$  ohm-cm range. Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity.* Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 6 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of  $10^6$ - $10^8$  ohm-cm, preferably  $10^7$  ohm-cm.* Appellant's claim 6 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 6 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

### Claim 7

Hastings '827 describes his first layer as a relatively highly resistive extruded layer of 13% *carbon-filled polypropylene* having a resistivity in the approximate range of  $10^7$  - $10^9$  ohm-cm. Appellant's first layer is described as a first layer of semiconductive *polyethylene*. Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 7 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 7 describes the core as a *fiber core*. Dinzen describes the first layer of Dinzen's col. 4, lines 50-63) embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's claim 7 describes the first layer as a first layer of semiconductive *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 7 describes the core as a *fiber core*. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's claim 7 describes the third layer as a third layer of an electrically relatively non-insulative *polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 7 describes the core as a *fiber core*. Dinzen describes the first layer of Dinzen's col. 5, lines 41-48 embodiment as a conducting sleeve. Appellant's claim 7 describes the first layer as a first layer of semiconductive *polyethylene*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 7 describes the core as a *fiber core*. Dinzen also characterizes

the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 7 describes the second layer as including an *electrically relatively non-conductive* polymer. Dinzen describes the first layer of Dinzen's col. 5, lines 55-59 embodiment as a conducting sleeve. Appellant's claim 7 describes the first layer as a first layer of semiconductive *polyethylene*. Dinzen describes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 7 describes the second layer as a second layer of *an electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 7 describes the first layer as a first layer of *semiconductive* polyethylene. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 7 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 7 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### **Claim 8**

Hastings '827 describes his first layer as a relatively highly resistive extruded layer of 13% carbon-filled *polypropylene* having a resistivity in the approximate range of 10<sup>7</sup>-10<sup>9</sup> ohm-cm. Appellant's first layer is described as a first layer of semiconductive, carbon black-loaded *polyethylene*. Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as "a fourth layer including a *metal braid shield*."

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 4, lines 30-49 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's claim 8 describes the first layer as a first layer of semiconductive, carbon black-loaded *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 4, lines

50-63) embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's claim 8 describes the first layer as a first layer of semiconductive, carbon black-loaded *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conducting sleeve of semiconducting rubber. Appellant's claim 8 describes the first layer as a first layer of semiconductive, carbon black-loaded polyethylene.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 5, lines 41-48 embodiment as a conducting sleeve. Appellant's claim 8 describes the first layer as a first layer of *semiconductive, carbon black-loaded polyethylene*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 5, lines 55-59 embodiment as a conducting sleeve. Appellant's claim 8 describes the first layer as a first layer of *semiconductive, carbon black-loaded polyethylene*. Dinzen describes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 8 describes the second layer as a second layer of *an electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 8 describes the first layer as a first layer of *semiconductive, carbon black-loaded polyethylene*. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 8 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 8 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### Claim 9

Hastings '827 describes his third layer as an electrically grounded conductive

*braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 9 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 9 describes the core as a *fiber core*. Dinzen describes the second layer of Dinzen's col. 4, lines 50-63 embodiment as high voltage insulation of *EPR*. Appellant's claim 9 describes the second layer as a second layer of electrically relatively non-conductive *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 9 describes the core as a *fiber core*. Dinzen describes the second layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as high voltage insulation of *EPR*. Appellant's claim 9 describes the second layer as a second layer of electrically relatively non-conductive *polyethylene*. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's claim 9 describes the third layer as a third layer of an electrically relatively non-insulative *polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 9 describes the core as a *fiber core*. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's claim 9 describes the fourth layer as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 9 describes the core as a *fiber core*. Dinzen describes the first layer of Dinzen's col. 5, lines 55-59 embodiment as a conducting sleeve. Appellant's claim 9 describes the first layer as a first layer of *semiconductive, carbon black-loaded polyethylene*.

Dinzen describes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 9 describes the second layer as a second layer of *an electrically relatively non-conductive polyethylene*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 9 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 9 describes the second layer as a second layer of electrically relatively *non-conductive* polyethylene. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 9 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

#### **Claim 10**

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 4, lines 30-49 embodiment as high voltage insulation of *ethylene-propylene rubber* (EPR). Appellant's claim 10 describes the second layer as a second layer of electrically relatively non-conductive, relatively high molecular weight, relatively low density *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 4, lines 50-63 embodiment as high voltage insulation of *EPR*. Appellant's claim 10 describes the second layer as a second layer of electrically relatively non-conductive, relatively high molecular weight, relatively low density *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and*

*two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as high voltage insulation of *EPR*. Appellant's claim 10 describes the second layer as a second layer of electrically relatively non-conductive, relatively high molecular weight, relatively low density *polyethylene*. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's claim 10 describes the third layer as a third layer of an electrically relatively non-insulative *polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 5, lines 41-48 embodiment as high voltage insulation of unspecified material. Appellant's claim 10 describes the second layer as a second layer of electrically relatively non-conductive, relatively high molecular weight, relatively low density polyethylene. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's claim 10 describes the fourth layer as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 10 describes the second layer as a second layer of *electrically relatively non-conductive*, relatively high molecular weight, relatively low density polyethylene.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 10 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 10 describes the second layer as a second layer of *electrically relatively non-conductive*, relatively high molecular weight, relatively low density polyethylene. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 10 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

## Claim 11

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 30-49 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 5, lines 41-48 embodiment as a *conducting sleeve*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*.

Appellant's claim 11 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 11 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 11 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 11 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### **Claim 12**

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative polyvinyl chloride. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 30-49 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative polyvinyl chloride.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen describes the third layer of

Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 5, lines 41-48 embodiment as *a conducting sleeve*. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 12 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 12 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 12 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 12 describes the third layer as a third layer of spirally extruded, *electrically relatively non-insulative* polyvinyl chloride.

### **Claim 13**

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col.

4, lines 30-49 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 5, lines 41-48 embodiment as *a conducting sleeve*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 13 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 13 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 13 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath.

Appellant's claim 13 describes the third layer as a third layer of spirally extruded, *electrically relatively non-insulative* polymer. All emphasis Appellant's.

#### Claim 14

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as "a fourth layer including a *copper-containing braid shield*."

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 14 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 14 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 14 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 14 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's fourth layer is described as a fourth layer including a *copper-containing braid shield*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 14 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 14 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 14 describes the first layer as a first layer of an electrically

relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 14 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric sheath.* Appellant's claim 14 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### Claim 15

Hastings '827 describes his third layer as an electrically grounded conductive *braid.* Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *copper- and tin-containing braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 15 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 30-49 embodiment as a conductor of braided copper wires. Appellant's claim 15 describes the fourth layer as a fourth layer including a *copper- and tin-containing braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires.* Appellant's claim 15 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 embodiment as a conductor of braided copper wires. Appellant's claim 15 describes the fourth layer as a fourth layer including a *copper- and tin-containing braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 15 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band.* Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer.* Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a screen braid of *copper* wires. Appellant's claim 15 describes the fourth layer as a fourth layer including a *copper- and tin-*

*containing braid shield.*

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 15 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's fourth layer is described as a fourth layer including a *copper- and tin-containing braid shield*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 15 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 15 describes the second layer as including an *electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 15 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 15 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 15 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. Hastings '935 describes the fourth layer as an electrically grounded *conductive braid* layer or sheath. Appellant's fourth layer is described as a fourth layer including a *copper- and tin-containing braid shield*.

### **Claim 16**

Hastings '827 describes his third layer as an electrically grounded *conductive braid*. Appellant's third layer is described as a third layer of an electrically relatively *non-insulative polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *tin-containing braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 16 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col.

4, lines 30-49 embodiment as a conductor of braided *copper* wires. Appellant's claim 16 describes the fourth layer as a fourth layer including a *tin-containing braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 16 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 embodiment as a conductor of braided copper wires. Appellant's claim 16 describes the fourth layer as a fourth layer including a *tin-containing braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 16 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer*. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a screen braid of *copper* wires. Appellant's claim 16 describes the fourth layer as a fourth layer including a *tin-containing braid* shield.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 16 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's fourth layer is described as a fourth layer including a *tin-containing braid* shield.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 16 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 16 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 16 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 16 describes the second layer as a second layer of an *electrically relatively*

*non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 16 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. Hastings '935 describes the fourth layer as an electrically grounded *conductive braid* layer or sheath. Appellant's fourth layer is described as a fourth layer including a *tin-containing braid* shield.

### Claim 17

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 17 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 30-49 embodiment as a conductor of braided *copper* wires. Appellant's claim 17 describes the fourth layer as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 17 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 embodiment as a conductor of braided copper wires. Appellant's claim 17 describes the fourth layer as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 17 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's third layer is described as a third layer of an

*electrically relatively non-insulative polymer.* Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a screen braid of copper wires. Appellant's claim 17 describes the fourth layer as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer.*

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 17 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's fourth layer is described as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer.*

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 17 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 17 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 17 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 17 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 17 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. Hastings '935 describes the fourth layer as an electrically grounded *conductive braid* layer or sheath. Appellant's fourth layer is described as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer.* All emphasis Appellant's.

### **Claim 18**

Hastings '827 describes his third layer as an electrically grounded *conductive braid*. Appellant's third layer is described as a third layer of an electrically relatively *non-insulative polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester*

*sheet material. Appellant's fourth layer is described as a fourth layer including a metal braid shield, the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 18 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 30-49 embodiment as a conductor of braided *copper* wires. Appellant's claim 18 describes the fourth layer as a fourth layer including a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 18 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 embodiment as a conductor of braided copper wires. Appellant's claim 18 describes the fourth layer as a fourth layer including a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 18 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer*. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a screen braid of copper wires. Appellant's claim 18 describes the fourth layer as a fourth layer including a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 18 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's fourth layer is described as a fourth layer including

a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.*

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 18 describes the core as a *fiber core.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor.* Appellant's claim 18 describes the second layer as including an *electrically relatively non-conductive polymer.*

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 18 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 18 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 18 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. Hastings '935 describes the fourth layer as an electrically grounded *conductive braid* layer or sheath. Appellant's fourth layer is described as a fourth layer including a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.*

### **Claim 19**

Hastings '827 describes his third layer as an electrically grounded conductive *braid.* Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 19 describes the core as a *fiber core.* Dinzen describes the fifth layer of Dinzen's col. 4, lines 30-49 embodiment as a casing of *polyvinyl chloride* (PVC). Appellant's claim 19 describes the fifth layer as a fifth layer including a relatively solvent- and abrasive-resistant flexible *polyurethane jacket.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a*

*core including a copper wire surrounded by six nickel-iron alloy wires.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen describes the fifth layer of Dinzen's col. 4, lines 50-63 embodiment as a casing of *PVC*. Appellant's claim 19 describes the fifth layer as a fifth layer including a relatively solvent- and abrasive-resistant flexible *polyurethane* jacket.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen describes the fifth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a casing of *PVC*. Appellant's claim 19 describes the fifth layer as a fifth layer including a relatively solvent- and abrasive-resistant flexible *polyurethane* jacket.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen describes the fifth layer of Dinzen's col. 5, lines 41-48 embodiment as a casing. Appellant's claim 19 describes the fifth layer as a fifth layer including a relatively solvent- and abrasive-resistant flexible *polyurethane* jacket.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 19 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 19 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 19 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 19 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

## Claim 20

Hastings '827 describes his third layer as an *electrically grounded conductive*

*braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 20 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 20 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 20 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 20 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 20 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 20 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 20 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as a *carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 20 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 20 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.



### Summary and Conclusion

Again, by Appellant's rough calculations, there are seventy-two hundred different high voltage cable configurations that can be made up from among these choices. Appellant submits that it is the antithesis of 35 U. S. C. § 103 obviousness to arrive at the combinations claimed in Appellant's claims 1-20 from the combinations described in Hastings '827, Dinzen and Hastings '935.

Accordingly, Appellant submits that the final rejection of his claims 1-20 is erroneous and should be reversed. Such action is respectfully requested.

Respectfully submitted,

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### **The Claims On Appeal**

1. A high voltage cable including a fiber core, a first layer of an electrically relatively non-insulative polymer, a second layer of an electrically relatively non-conductive polymer, a third layer of an electrically relatively non-insulative polymer, a fourth layer including a metal braid shield, and a fifth layer including a relatively solvent- and abrasive-resistant polymer jacket.
2. The cable of claim 1 wherein the fiber core includes a stranded fiber polyester core.
3. The cable of claim 2 wherein the fiber core is impregnated to increase its bulk conductivity.
4. The cable of claim 3 wherein the fiber core is impregnated with carbon black.
5. The cable of claim 1 wherein the fiber core is impregnated to increase its bulk conductivity.
6. The cable of claim 5 wherein the fiber core is impregnated with carbon black.
7. The cable of claim 1 wherein the first layer includes a layer of semiconductive polyethylene.
8. The cable of claim 7 wherein the layer of semiconductive polyethylene includes a layer of carbon black-loaded polyethylene.
9. The cable of claim 1 wherein the second layer includes a layer of electrically relatively non-conductive polyethylene.
10. The cable of claim 9 wherein the layer of electrically relatively non-conductive polyethylene includes a layer of relatively high molecular weight, relatively low density polyethylene.
11. The cable of claim 1 wherein the third layer includes a layer of electrically relatively non-insulative polyvinyl chloride.
12. The cable of claim 11 wherein the layer of electrically relatively non-insulative polyvinyl chloride includes a layer of spirally extruded electrically relatively non-insulative polyvinyl chloride.
13. The cable of claim 1 wherein the third layer includes a layer of spirally extruded electrically relatively non-insulative polymer.
14. The cable of claim 1 wherein the metal braid shield includes a copper-containing braid shield.

15. The cable of claim 14 wherein the copper-containing braid shield further contains tin.

16. The cable of claim 1 wherein the metal braid shield includes a tin-containing braid shield.

17. The cable of claim 1 wherein the metal braid shield includes a metal braid covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer.

18. The cable of claim 1 wherein the pitch of the braid of the metal braid shield is between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.

19. The cable of claim 1 wherein the polymer jacket includes a flexible polyurethane jacket.

20. The cable of claim 1 in combination with a high magnitude electrostatic potential supply, a device for the electrostatically aided atomization and dispensing of a coating material, a source of the coating material coupled to the device, the high voltage cable coupling the potential supply to the device.



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*Application No.:* 09/982,154

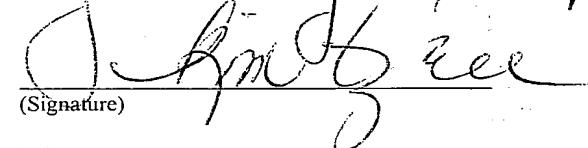
*Invention:* HIGH VOLTAGE CABLE

*Applicant:* Brian E. Gorrell

*Filed:* October 18, 2001

*Attorney*  
*Docket:* 3030-69081

*Examiner:* William H. Mayo III

on January 19, 2004  
  
(Signature)

Kim Tyree  
(Printed Name)

**APPEAL BRIEF**

Mail Stop Appeal Brief  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This appeal brief is submitted in triplicate in furtherance of the appeal taken November 20, 2003. The Commissioner is hereby authorized to charge the \$330 fee for filing this appeal brief, as well as any other fees which may be necessary to constitute this a timely filed appeal brief, to Appellant's undersigned counsel's deposit account 10-0435, with reference to file number 3030-69081. A duplicate copy of this authorization is enclosed for this purpose.

**Real Party In Interest**

The real party in interest is Illinois Tool Works Inc., by virtue of an assignment recorded October 18, 2001 in the records of the Patent and Trademark Office on patent record reel 012282, beginning at frame 0187.

### **Related Appeals and Interferences**

There are no related appeals or interferences of which the undersigned is aware.

### **Status of Claims**

Claims 1-20, all of the claims in this application, are finally rejected. The final rejections of all of claims 1-20 are appealed.

### **Status of Amendments**

No amendments were filed subsequent to final rejection.

### **Summary of the Invention**

The invention may best be understood by referring to the appealed claims 1-20, annotated with parenthetic reference numbers and related notes from the detailed description.

With reference to claim 1, the invention is a high voltage cable (10) including a fiber core (20), a first layer (22) of an electrically relatively non-insulative polymer, a second layer (24) of an electrically relatively non-conductive polymer, a third layer (26) of an electrically relatively non-insulative polymer, a fourth layer (28) including a metal braid shield, and a fifth layer (30) including a relatively solvent- and abrasive-resistant polymer jacket.

With reference to claim 2, the invention is the cable (10) of claim 1 wherein the fiber core (20) includes a stranded fiber polyester core (page 4, lines 5-6).

With reference to claim 3, the invention is the cable (10) of claim 2 wherein the fiber core (20) is impregnated (page 4, lines 6-7) to increase its bulk conductivity (page 4, lines 7-8).

With reference to claim 4, the invention is the cable (10) of claim 3 wherein the fiber core (20) is impregnated with carbon black (page 4, lines 6-7).

With reference to claim 5, the invention is the cable (10) of claim 1 wherein the fiber core (20) is impregnated (page 4, lines 6-7) to increase its bulk conductivity (page 4, lines 7-8).

With reference to claim 6, the invention is the cable (10) of claim 5 wherein the fiber core (20) is impregnated with carbon black (page 4, lines 6-7).

With reference to claim 7, the invention is the cable (10) of claim 1 wherein the first layer (22) includes a layer (22) of semiconductive polyethylene (page 4, lines 13-16).

With reference to claim 8, the invention is the cable (10) of claim 7 wherein the layer of semiconductive polyethylene (page 4, lines 13-16) includes a layer of carbon black-loaded polyethylene (page 4, lines 13-16).

With reference to claim 9, the invention is the cable (10) of claim 1 wherein the second layer (24) includes a layer (24) of electrically relatively non-conductive polyethylene (page 4, lines 16-19).

With reference to claim 10, the invention is the cable (10) of claim 9 wherein the layer (24) of electrically relatively non-conductive polyethylene (page 4, lines 16-19) includes a layer of relatively high molecular weight, relatively low density polyethylene (page 4, lines 16-19).

With reference to claim 11, the invention is the cable (10) of claim 1 wherein the third layer (26) includes a layer (26) of electrically relatively non-insulative polyvinyl chloride (page 4, lines 20-21).

With reference to claim 12, the invention is the cable (10) of claim 11 wherein the layer (26) of electrically relatively non-insulative polyvinyl chloride (page 4, lines 20-21) includes a layer (26) of spirally extruded electrically relatively non-insulative polyvinyl chloride (page 4, lines 20-21).

With reference to claim 13, the invention is the cable (10) of claim 1 wherein the third layer (26) includes a layer (26) of spirally extruded electrically relatively non-insulative polymer (page 4, lines 20-21):

With reference to claim 14, the invention is the cable (10) of claim 1 wherein the metal braid shield (28) includes a copper-containing braid shield (page 4, lines 22-23).

With reference to claim 15, the invention is the cable (10) of claim 14 wherein the copper-containing braid shield (28) further contains tin (page 4, lines 22-23).

With reference to claim 16, the invention is the cable (10) of claim 1 wherein the metal braid shield (28) includes a tin-containing braid shield (page 4, lines 22-23).

With reference to claim 17, the invention is the cable (10) of claim 1 wherein the metal braid shield (28) includes a metal braid covering between about 85% and about 100% of the outside surface of the third layer (26) of electrically relatively non-insulative polymer (page 4, lines 22-23).

With reference to claim 18, the invention is the cable (10) of claim 1 wherein the pitch of the braid of the metal braid shield (28) is between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable (page 4, lines 23-25).

With reference to claim 19, the invention is the cable (10) of claim 1 wherein the polymer jacket (30) includes a flexible polyurethane jacket (col. 5, lines 1-2).

With reference to claim 20, the invention is the cable (10) of claim 1 in combination with a high magnitude electrostatic potential supply (12), a device (14) for the electrostatically aided atomization and dispensing of a coating material (16), and a source of the coating material (16) coupled to the device (14). The high voltage cable (10) couples the potential supply (12) to the device (14).

### **Issues**

The issues on appeal are: 1) whether claims 1, 2 and 9-20 would have been 35 U. S. C. § 103 obvious in view of the combination of Hastings U. S. Patent 4,576,827 (hereinafter Hastings '827) and Dinzen U. S. Patent 5,250,755 (hereinafter Dinzen); and, 2) whether claims 3-8 would have been 35 U. S. C. § 103 obvious in view of Hastings '827, Dinzen and Hastings U. S. Patent 4,739,935 (hereinafter Hastings '935).

### **Grouping of Claims**

All of claims 1-20 are believed to be separately patentable, at least for the reasons set forth in the following arguments.

### **Argument**

In the final official action of August 21, 2003 the Examiner rejected claims 1, 2 and 9-20 under 35 U. S. C. § 103. The Examiner relied upon the combination of Hastings '827 and Dinzen to support this rejection.

The Examiner takes the position that Hastings '827 teaches a high voltage cable including a fiber core 200, a first layer 202 of electrically relatively non-insulative polymer, a second layer 204 of an electrically relatively non-conductive polymer, a fourth layer 206 including a metal braid shield, and a fifth layer 210 including a relatively solvent- and abrasion-resistant polymer jacket.

With respect to claim 2, the Examiner takes the position that Hastings '827 teaches that the fiber core 200 includes a stranded fiber polyester core.

With respect to claims 9 and 10, the Examiner takes the position that Hastings

‘827 teaches that the second layer 204 may include a non-conductive layer of low-density polyethylene.

With respect to claim 17, the Examiner takes the position that Hastings ‘827 teaches that the metal braid shield 206 includes a metal braid covering between about (sic -- 85% and) 100% of the outside surface of the second layer 204 of electrically relatively insulative polymer.

With respect to claim 18, the Examiner takes the position that Hastings ‘827 teaches that the fourth layer 206 including a metal braid shield has a pitch.

With respect to claim 19, the Examiner takes the position that Hastings ‘827 teaches that the polymer jacket 210 includes a flexible polyurethane jacket.

With respect to claim 20, the Examiner takes the position that Hastings ‘827 teaches the combination including a high-magnitude potential supply 16a, a spray gun for the electrostatically aided atomization and dispensing of a coating material, a source 4a of the coating material coupled to the spray gun, and the high voltage cable 16 coupled to the potential supply 16a and the spray gun.

The Examiner concedes that Hastings ‘827 does not teach claim 1’s specifically recited third layer of an electrically relatively non-insulative polymer between the second layer of an electrically relatively non-conductive polymer and the fourth layer including a metal braid shield. The Examiner concedes that Hastings ‘827 does not teach claim 11’s specifically recited third layer including a layer of electrically relatively non-insulative polyvinyl chloride. The Examiner concedes that Hastings ‘827 does not teach claims 12 and 13’s specifically recited third layer including a layer of spirally extruded electrically relatively non-insulative polymer. The Examiner concedes that Hastings ‘827 does not teach claim 14’s specifically recited metal braid shield including a copper-containing braid shield. The Examiner concedes that Hastings ‘827 does not teach claim 15’s specifically recited metal braid shield including a copper- and tin-containing braid shield. The Examiner concedes that Hastings ‘827 does not teach claim 16’s specifically recited metal braid shield including a tin-containing braid shield. The Examiner concedes that Hastings ‘827 does not teach claim 17’s specifically recited metal braid shield includes a metal braid covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer. The Examiner concedes that Hastings ‘827 does not teach claim 18’s specifically recited pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.

Specifically with respect to claims 1 and 17, the Examiner relies upon Dinzen to teach a core 1 surrounded by a first layer conductive sleeve 2, a second layer high voltage insulative sleeve 3 surrounding the first layer conductive sleeve 2, a third layer conductive sleeve 4 surrounding the second layer high voltage insulative sleeve 3, a fourth layer of braided wires 5 surrounding the third layer conductive sleeve 4, and an outer casing 6 of PVC surrounding the fourth layer of braided wires 5.

With respect to claims 11 and 12, the Examiner relies upon Dinzen to teach that the third layer of conductive material 4 between the second layer of insulative material 3 and the fourth layer of braided conductive material 5 may be made of a synthetic resin, such as embedded PVC.

With respect to claim 14, the Examiner relies upon Dinzen to teach that the braided shield 5 is made of copper wire.

With respect to claims 1, 14 and 17, the Examiner concludes that it would have been 35 U. S. C. § 103 obvious to modify the cable configuration of Hastings '827 to include a third layer of conductive polymer material extending between the second layer of insulative material and a fourth layer of braided material and copper braided shield as taught by Dinzen because Dinzen teaches that such a configuration is a conventional high voltage cable configuration and provides for carrying high voltages without damaging the cable itself, citing Dinzen, col. 1, lines 7-13.

With respect to claims 12, 13, 15 and 16, the Examiner concludes that it would have been 35 U. S. C. § 103 obvious to modify the cable configuration of Hastings '827 as previously modified by Dinzen to include a layer of spirally wrapped PVC and copper-tin braided shield, citing In re Leshin, 125 USPQ 416.

With respect to claim 18, the Examiner concludes that it would have been 35 U. S. C. § 103 obvious to further modify the cable configuration of Hastings '827 as previously modified by Dinzen to include a braided shield having a pitch between 0° and 20° to a perpendicular to the longitudinal extent of the cable, citing Span-Deck Inc. v. Fab-Con Inc., 215 USPQ 835 (CA 8, 1982).

The Examiner rejected claims 3-8 under 35 U. S. C. § 103. The Examiner relied upon the combination of Hastings '827, Dinzen and Hastings '935 to support this rejection. The Examiner relied upon Hastings '827 and Dinzen as previously noted. The Examiner relies upon Hastings '935 to teach a high voltage cable utilized in a spray system that eliminates the possibility of having corona inducing voids or spaces between the carbon loaded sheath and the outer dielectric layers, thereby eliminating the possibility of cable

failure, citing Hastings '935 col. 2, lines 27-42. The Examiner concedes that the Hastings '827/Dinzen combination neither discloses nor suggests the fiber core being impregnated to increase its conductivity, nor the fiber core being impregnated with carbon black to increase its conductivity.

With respect to claim 3, the Examiner takes the position that Hastings '935 teaches that the fiber core 42 is impregnated to increase its bulk conductivity.

With respect to claim 4, the Examiner takes the position that Hastings '935 teaches that the fiber core 42 is impregnated with carbon black, apparently equating silicon carbide with carbon black.

With respect to claim 5, the Examiner takes the position that Hastings '935 teaches that the fiber core 42 is impregnated to increase its bulk conductivity.

With respect to claim 6, the Examiner takes the position that Hastings '935 teaches that the fiber core 42 is impregnated with carbon black.

With respect to claim 7, the Examiner takes the position that Hastings '935 teaches that the first layer 202 includes a layer of semiconductive polyethylene, citing Hastings '935, col. 14, lines 50-55.

With respect to claim 8, the Examiner takes the position that Hastings '935 teaches that the first layer 44 includes a layer of semiconductive polyethylene that includes a layer of carbon black-loaded polyethylene, citing Hastings '935, col. 4, lines 50-55.

### **Analysis of the References**

The references relied upon by the Examiner describe the following distinct cable structure, starting from the cores of the described structures and working outwardly:

#### **I) (from Hastings '827)**

1) twisted strands 200 of Dacron for strength and Nicalon silicon carbide fiber for electrical conductivity to provide a specific resistivity in the approximately  $10^3$  ohm-cm range (Hastings '827, col. 14, lines 46-48);

2) a relatively highly resistive extruded layer 202 of 13% carbon-filled polypropylene having a resistivity in the approximate range of  $10^7$  -  $10^9$  ohm-cm so that the high voltage gradients that would otherwise tend to occur at the outwardly projecting end 203 of any broken Nicalon silicon carbide filament are markedly reduced in the relatively highly resistive layer 202 (Hastings '827, col. 14, line 48-col. 15, line 4);

3) a dielectric sheath 204 of Alathon 3535 NC10 high molecular

weight, low density polyethylene to insulate the core 200 for high voltage operation (Hastings '827, col. 15, lines 1-21);

- 4) an electrically grounded conductive braid 206 of unspecified material (Hastings '827, col. 15, lines 1-21);
- 5) a lapped layer 208 of polyester sheet material (Hastings '827, col. 15, lines 1-21); and,
- 6) a layer 210 of polyurethane (Hastings '827, col. 15, lines 1-21).

**II) (from Dinzen, col. 4, lines 30-49)**

- 1) an inner conductor 1 having a core in the form of a synthetic plastic string and around it a layer of six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord;
- 2) a conducting sleeve 2 of semiconducting rubber;
- 3) high voltage insulation 3 of ethylene-propylene rubber (EPR);
- 4) a conducting sleeve 4 of semiconducting rubber;
- 5) a conductor 5 of braided copper wires; and,
- 6) a casing 6 of polyvinyl chloride (PVC).

**III) (from Dinzen, col. 4, lines 50-63)**

- 1) a conductor 1 having a core including a copper wire, and around it a layer of six nickel-iron alloy wires;
- 2) a conducting sleeve 2 of semiconducting rubber;
- 3) high voltage insulation 3 of EPR;
- 4) a conducting sleeve 4 of semiconducting rubber;
- 5) a conductor 5 of braided copper wires; and,
- 6) a casing 6 of PVC.

**IV) (from Dinzen, col. 4, lines 50-63 and col. 5, lines 59-62)**

- 1) a cable core 1' having two bare high voltage conductors 7 of Ni-Fe-alloy wires and two insulated heating conductors 8 of Ni-Fe alloy wire with insulation 9, all stranded together to form a cable core;
- 2) a conducting sleeve 2 of semiconducting rubber;
- 3) high voltage insulation 3 of EPR;
- 4) a conductive sleeve 4' of semiconducting coated band;
- 5) a screen braid 5 of copper wires; and,

6) a casing 6 of PVC.

**V) (from Dinzen, col. 5, lines 41-48)**

1) a high voltage conductor 1 including a first heating conductor 10, an insulation 11, a second heating conductor 12, an insulation 13, and a high voltage conductor 14, all of unspecified materials, although it is not unreasonable to assume that the high voltage conductor 14 is constructed from the same material as the high voltage conductor 1 of II-1) above, namely, a synthetic plastic string and around it a layer of 6 stranding elements each including a core wire and a layer of 6 steel wires stranded to form a cord (Dinzen, col. 5, lines 41-48);

- 2) a conducting sleeve 2 of unspecified material;
- 3) high voltage insulation 3 of unspecified material;
- 4) a conducting sleeve of unspecified material;
- 5) a conductor 5 of unspecified material;
- 6) a band 6', presumably semiconductive, of unspecified material; and,
- 7) a casing 6 of unspecified material.

**VI) (from Dinzen, col. 5, lines 55-59)**

- 1) a conductor having a core provided with two heating conductors 8, 9 and one heat control conductor 15-16, all of unspecified materials;
- 2) a conducting sleeve 17 of unspecified material; and,
- 3) a high voltage conductor 18 of unspecified material.

**VII) (from Hastings '935)**

- 1) a core 40 of twisted strands of Dacron for strength and Nicalon silicon carbide fiber for electrical conductivity to provide a specific resistivity in the approximately  $10^3$  ohm-cm range (Hastings '935, col. 3, line 55-col. 4, line 3);
- 2) spirally wound insulative thread or ribbon 42 having a pitch of 3/8 inch and made from nylon, polyurethane, Mylar, Dacron, PET or other polyester (Hastings '935, col. 4, lines 4-47); and,
- 3) a carbon-loaded polyethylene layer 44 having a resistivity of  $10^6$ - $10^8$  ohm-cm, preferably  $10^7$  ohm-cm (Hastings '935, col. 4, lines 52-62).
- 4) a dielectric sheath 46 constructed from a material which will blend or chemically cross-link with the material of the sheath 44, with the material of sheath 46

having a resistivity in the range of  $10^{14}$ - $10^{16}$  ohm-cm. Sheath 46 can be constructed from, for example, the same polymer, as sheath 44, for example, polyethylene or polypropylene, or the mating surfaces of sheaths 44, 46 can be melted into each other, ultrasonically welded, adhered, or wetted to compatibilize the materials, etc. Alternatively, both sheaths 44 and 46 can be fabricated from different but compatible co-polymers such as ethylene propylene copolymer and ethylene propylene diene terpolymers, or from two different materials which are reactive with each other to form a chemical bond or crosslink at their interface, or, if sheaths 44 and 46 are formed of incompatible materials, a compatibilizing layer can be incorporated between the two layers to avoid any interfacial void;

- 5) an electrically grounded conductive braid layer or sheath 50;
- 6) a layer 52 of Mylar brand polyester ribbon wrapped to provide a 50% overlap;
- 7) a layer 54 of polyurethane for abrasion resistance.

From these embodiments, Appellant counts six different choices for the core of the cable, three different choices for the first layer, four different choices for the second layer, five different choices for the third layer, five different choices for the fourth layer, and four different choices for the fifth layer. These choices include:

**for the core: I-1) and VII-1)** twisted strands of Dacron polyester and Nicalon silicon carbide fiber providing a specific resistivity in the approximately  $10^3$  ohm-cm range; **II-1)** an inner conductor having a core in the form of a synthetic plastic string and around it a layer of six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord; **III-1)** a conductor having a core including a copper wire, and around it a layer of six nickel-iron alloy wires; **IV-1)** a cable core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together to form the cable core; **V-1)** a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor, all of unspecified material; and, **VI-1)** a conductor having a core provided with two heating conductors and one heat control conductor, all of unspecified material;

**for the first layer: I-2)** an extruded layer of carbon-filled polypropylene having a resistivity in the approximate range of  $10^7$  -  $10^9$  ohm-cm; **II-2 to VI-2)** a conducting sleeve of semiconducting rubber; and, **VII-2)** spirally wound insulative thread or ribbon having a pitch of 3/8 inch and made from nylon, polyurethane, Mylar, Dacron, PET or other

polyester;

**for the second layer:** **I-3)** a dielectric sheath; **II-3) to V-3)** high voltage insulation; **VI-3)** a high voltage conductor; and **VII-3)** a carbon-loaded polyethylene layer having a resistivity of  $10^6$ - $10^8$  ohm-cm;

**for the third layer:** **I-4)** an electrically grounded conductive braid of unspecified material; **II-4) and III-4)** a conducting sleeve of semiconducting rubber; **IV-4)** a conducting sleeve of semiconducting coated band; **V-4)** a conducting sleeve of unspecified material; and **VII-4)** a dielectric sheath constructed from a material which will blend or chemically cross-link with the material of the sheath of VII-3), with the material of sheath of VII-4) having a resistivity in the range of  $10^{14}$ - $10^{16}$  ohm-cm. The sheaths VII-3) and VII-4) can be constructed from the same polymer, or the mating surfaces of sheaths VII-3) and VII-4) can be melted into each other, ultrasonically welded, adhered, or wetted to compatibilize the materials, etc., or, the sheaths VII-3) and VII-4) can be fabricated from different but compatible co-polymers such as ethylene propylene copolymer and ethylene propylene diene terpolymers, or from two different materials which are reactive with each other to form a chemical bond or crosslink at their interface, or, if sheaths VII-3) and VII-4) are formed of incompatible materials, a compatibilizing layer can be incorporated between the two layers to avoid any interfacial void;

**for the fourth layer:** **I-5)** a lapped layer of polyester sheet material; **II-5)** and **III-5)** a conductor of braided copper wires; **IV-5)** a screen braid of copper wires; **V-5)** a conductor; and, **VII-5)** an electrically grounded conductive braid layer or sheath; and,

**for the fifth layer:** **I-6)** a layer of polyurethane; **II-6) to IV-6)** a casing of PVC; **V-6)** a casing; and **VII-6)** a layer of Mylar brand polyester ribbon wrapped to provide a 50% overlap.

By Appellant's calculation, these choices provide seventy-two hundred different high voltage cable configurations that can be made up from among these choices (six different core choices, three different first layer choices, four different second layer choices, five different third layer choices, five different fourth layer choices, and four different fifth layer choices).

The question thus becomes, "How would the person of ordinary skill in the art have known which of the materials appearing in these various listings to pick for which layers?" The answer, Appellant submits, is that the person of ordinary skill in the art

wouldn't have known at the time Appellant made the invention which is the subject of the claims on appeal, which of the materials appearing in these various listings to pick for which layers.

The problem with the Examiner's position that substituting specific isolated layers of specific materials from Dinzen and specific isolated layers of specific materials from Hastings '935 for specific isolated layers of specific materials of Hastings '827 is that the person of ordinary skill would have needed Appellant's disclosure to choose Appellant's combination. It is well settled that an inventor's own disclosure cannot be used as a guide to combine isolated elements from the prior art to establish the 35 U. S. C. § 103 obviousness of the inventor's claims.

The position and material makeup of each layer of Hastings '827 exists in the combination of Hastings '827 to achieve a unique function in the combination of Hastings '827. The position and material makeup of each layer of Dinzen exists in the combination of Dinzen to achieve a unique function in the combination of Dinzen. The position and material makeup of each layer of Hastings '935 exists in the combination of Hastings '935 to achieve a unique function in the combination of Hastings '935. To argue that replacing the material used in a layer of one of these references with a material used in a different layer of another, or between two layers found in another, is less a reliable prediction of the outcome of such an experiment than it is a guess; less evidence of 35 U. S. C. § 103 obviousness and more a matter for speculation.

Some motivation must be found in the prior art of record for constructing the cable of the claims. However, no motivation is found where motivation must be to make out a *prima facie* case of 35 U.S.C. §103 obviousness. That is, no motivation is found in the prior art of record. Rather, the only source for the motivation to construct the cable of Appellant's claims is Appellant's claims themselves. Using the claims as the source for the motivation to construct the claimed cable does not make out a *prima facie* case of 35 U.S.C. §103 obviousness. Quite the contrary, Appellant submits. It makes out a *prima facie* case of 35 U.S.C. §103 unobviousness. It is well-settled that

The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time . . . That which may be made clear and thus 'obvious' to a court, with the invention fully diagrammed and aided . . . by [experts in the field], may have been a breakthrough of substantial dimension when first unveiled.

Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543,

547-548 (Fed. Cir. 1985). Confer Uniroyal Inc. v. Rudkin-Wiley Corp., 5 USPQ 2d 1434, 1438:

The PTO has the burden under section 103 to establish a *prima facie* case of obviousness (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984)). It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references (citing In re Lalu, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1984); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 297 n.24, 227 USPQ 657, 667 n.24 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)). This it has not done. The Board points to nothing in the cited references, either alone or in combination, suggesting or teaching Fine's invention." In re Fine, 5 USPQ 2d 1596, 1598-99 (Fed. Cir. 1988).

From its discussion of the prior art it appears to us that the court, guided by the defendants, treated each reference as teaching one or more of the specific components for use in the Feil system, although the Feil system did not then exist. Thus the court reconstructed the Feil system, using the blueprint of the Feil claims. As is well established, this is legal error (citing Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 774, 218 USPQ 781, 791 (Fed. Cir. 1983), *cert. denied*, 104 S.Ct. 1284, 224 USPQ 520 (1984)).

Interconnect Planning, supra. at 548.

Here the Examiner clearly has used Appellants' claims as a blueprint for combining elements of Hastings '827, Dinzen and Hastings '935 to support his position concerning the 35 U.S.C. §103 obviousness of Appellant's claims. As the above-quoted cases make clear, that is not the analysis contemplated by 35 U.S.C. §103.

More is required to make out a *prima facie* case of obviousness under 35 U. S. C. § 103 than simply finding the isolated bits and pieces of the claimed arrangement in the prior art.

When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. See, e.g., McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the Graham factors).

The factual inquiry whether to combine references must be thorough and searching.” Id. It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. See, e.g., Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) (“a showing of a suggestion, teaching, or motivation to combine the prior art references is an ‘essential component of an obviousness holding’”) (quoting C.R. Bard, Inc., v. M3 Systems, Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998)); In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) (“Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.”); In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) (“teachings of references can be combined only if there is some suggestion or incentive to do so.”) (emphasis in original) (quoting ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)).

The need for specificity pervades this authority. See, e.g., In re Kotzab, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) (“particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed”); In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) (“even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.”); In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (the examiner can satisfy the burden of showing obviousness of the combination “only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references”).

With respect to Lee’s application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that which Lee described. The examiner’s conclusory statements that “the demonstration mode is just a

programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion.

In re Lee, 61 U. S. P. Q. 2d 1430, 1433-1435, (Fed. Cir., 2002).

Appellant submits that the combination relied upon by the Examiner does not meet the requirements recognized by In re Lee to make out a *prima facie* case of 35 U. S. C. § 103 obviousness. Accordingly, Appellant submits that the 35 U. S. C. § 103 rejection of claims 1, 2 and 9-20 is overcome.

### **The Claims Are Separately Patentable**

The claims are separately patentable, and additionally are patentable over 35 U. S. C. § 103 obvious combination of the cited references, for at least the above reasons and the following clear distinctions from the prior art of record indicated in italics.

### **Claim 1**

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 1 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 1

describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 1 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 1 describes the core as a *fiber* core.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 1 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor.* Appellant's claim 1 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 1 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 1 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 1 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

## Claim 2

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 2 describes the core as a stranded fiber *polyester* core. Hastings '827 describes his third layer as an electrically grounded conductive *braid.* Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each*

*including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.*

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.*

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 2 describes the core as *a stranded fiber polyester core.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as *a high voltage conductor.* Appellant's claim 2 describes the second layer as including an *electrically relatively non-conductive polymer.*

Hastings '935 describes the first layer as a spirally wound *insulative* thread or ribbon. Appellant's claim 2 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of  $10^6$ - $10^8$  ohm-cm, preferably  $10^7$  ohm-cm.* Appellant's claim 2 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 2 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

### **Claim 3**

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 3 describes the core as *a stranded fiber polyester core impregnated to increase its bulk conductivity.* Hastings '827 describes his third layer as an *electrically grounded conductive braid.* Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer.* Hastings

‘827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant’s fourth layer is described as a fourth layer including a *metal braid* shield.

Dinzen describes the core of Dinzen’s col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant’s claim 3 describes the core as a *stranded fiber polyester core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen’s col. 4, lines 50-63) embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant’s claim 3 describes the core as a *stranded fiber polyester core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen’s col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant’s claim 3 describes the core as a *stranded fiber polyester core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen’s col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant’s claim 3 describes the core as a *stranded fiber polyester core impregnated to increase its bulk conductivity*.

Dinzen describes the core of Dinzen’s col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor*. Appellant’s claim 3 describes the core as a *stranded fiber polyester core impregnated to increase its bulk conductivity*. Dinzen also characterizes the second layer of Dinzen’s col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant’s claim 3 describes the second layer as including an *electrically relatively non-conductive polymer*.

Hastings ‘935 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide*. Appellant’s claim 3 describes the core as a *stranded fiber polyester core impregnated to increase its bulk conductivity*. Hastings ‘935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant’s claim 3 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings ‘935 describes the second layer as a *carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant’s claim 3 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer.

Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 3 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. All emphasis Appellant's.

#### Claim 4

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*. Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 4 describes the core as *a stranded fiber polyester core*

*impregnated with carbon black to increase its bulk conductivity.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as *a high voltage conductor.* Appellant's claim 4 describes the second layer as including an *electrically relatively non-conductive polymer.*

Hastings '935 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 4 describes the core as *a stranded fiber polyester core impregnated with carbon black to increase its bulk conductivity.* Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 4 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 4 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 4 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### **Claim 5**

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.* Hastings '827 describes his third layer as an electrically grounded conductive *braid.* Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires.* Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.*

Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as *a high voltage conductor.* Appellant's claim 5 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the core as a core of twisted strands of polyester and *silicon carbide fiber* for electrical conductivity to provide a specific resistivity in the approximately  $10^3$  ohm-cm range. Appellant's claim 5 describes the core as *a fiber core impregnated to increase its bulk conductivity.* Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 5 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of  $10^6$ - $10^8$  ohm-cm, preferably  $10^7$  ohm-cm.* Appellant's claim 5 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric sheath.* Appellant's claim 5 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

### Claim 6

Hastings '827 describes his core as three strands of Dacron polyester twisted with *four strands of Nicalon silicon carbide.* Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity.* Hastings '827 describes his third layer as an electrically grounded conductive braid. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each*

*including a core wire and a layer of six steel wires stranded to form a cord. Appellant's claim 6 describes the core as a fiber core impregnated with carbon black to increase its bulk conductivity.*

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity*. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as *a high voltage conductor*. Appellant's claim 6 describes the second layer as including an *electrically relatively non-conductive polymer*.

Hastings '935 describes the core as a core of twisted strands of polyester and *silicon carbide fiber* for electrical conductivity to provide a specific resistivity in the approximately  $10^3$  ohm-cm range. Appellant's claim 6 describes the core as *a fiber core impregnated with carbon black to increase its bulk conductivity*. Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 6 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of  $10^6$ - $10^8$  ohm-cm, preferably  $10^7$  ohm-cm*. Appellant's claim 6 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 6 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

### Claim 7

Hastings '827 describes his first layer as a relatively highly resistive extruded layer of 13% *carbon-filled polypropylene* having a resistivity in the approximate range of  $10^7$  -  $10^9$  ohm-cm. Appellant's first layer is described as a first layer of semiconductive *polyethylene*. Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 7 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 7 describes the core as a *fiber core*. Dinzen describes the first layer of Dinzen's col. 4, lines 50-63) embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's claim 7 describes the first layer as a first layer of semiconductive *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 7 describes the core as a *fiber core*. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's claim 7 describes the third layer as a third layer of an electrically relatively non-insulative *polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 7 describes the core as a *fiber core*. Dinzen describes the first layer of Dinzen's col. 5, lines 41-48 embodiment as a conducting sleeve. Appellant's claim 7 describes the first layer as a first layer of semiconductive *polyethylene*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 7 describes the core as a *fiber core*. Dinzen also characterizes

the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 7 describes the second layer as including an *electrically relatively non-conductive* polymer. Dinzen describes the first layer of Dinzen's col. 5, lines 55-59 embodiment as a conducting sleeve. Appellant's claim 7 describes the first layer as a first layer of semiconductive *polyethylene*. Dinzen describes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 7 describes the second layer as a second layer of *an electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 7 describes the first layer as a first layer of *semiconductive* polyethylene. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 7 describes the second layer as a second layer of *an electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 7 describes the third layer as a third layer of *an electrically relatively non-insulative* polymer.

### Claim 8

Hastings '827 describes his first layer as a relatively highly resistive extruded layer of 13% carbon-filled *polypropylene* having a resistivity in the approximate range of 10<sup>7</sup>-10<sup>9</sup> ohm-cm. Appellant's first layer is described as a first layer of semiconductive, carbon black-loaded *polyethylene*. Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of *an electrically relatively non-insulative polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as "a fourth layer including a *metal braid shield*."

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 4, lines 30-49 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's claim 8 describes the first layer as a first layer of semiconductive, carbon black-loaded *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 4, lines

50-63) embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's claim 8 describes the first layer as a first layer of semiconductive, carbon black-loaded *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conducting sleeve of semiconducting rubber. Appellant's claim 8 describes the first layer as a first layer of semiconductive, carbon black-loaded *polyethylene*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 5, lines 41-48 embodiment as a conducting sleeve. Appellant's claim 8 describes the first layer as a first layer of *semiconductive, carbon black-loaded polyethylene*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 8 describes the core as a *fiber* core. Dinzen describes the first layer of Dinzen's col. 5, lines 55-59 embodiment as a conducting sleeve. Appellant's claim 8 describes the first layer as a first layer of *semiconductive, carbon black-loaded polyethylene*. Dinzen describes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 8 describes the second layer as a second layer of *an electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 8 describes the first layer as a first layer of *semiconductive, carbon black-loaded polyethylene*. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 8 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 8 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### Claim 9

Hastings '827 describes his third layer as an electrically grounded conductive

*braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 9 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 9 describes the core as a *fiber core*. Dinzen describes the second layer of Dinzen's col. 4, lines 50-63 embodiment as high voltage insulation of *EPR*. Appellant's claim 9 describes the second layer as a second layer of electrically relatively non-conductive *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 9 describes the core as a *fiber core*. Dinzen describes the second layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as high voltage insulation of *EPR*. Appellant's claim 9 describes the second layer as a second layer of electrically relatively non-conductive *polyethylene*. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's claim 9 describes the third layer as a third layer of an electrically relatively non-insulative *polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 9 describes the core as a *fiber core*. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's claim 9 describes the fourth layer as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 9 describes the core as a *fiber core*. Dinzen describes the first layer of Dinzen's col. 5, lines 55-59 embodiment as a conducting sleeve. Appellant's claim 9 describes the first layer as a first layer of *semiconductive, carbon black-loaded polyethylene*.

Dinzen describes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 9 describes the second layer as a second layer of *an electrically relatively non-conductive polyethylene*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 9 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 9 describes the second layer as a second layer of electrically relatively *non-conductive* polyethylene. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 9 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

#### Claim 10

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 4, lines 30-49 embodiment as high voltage insulation of *ethylene-propylene rubber* (EPR). Appellant's claim 10 describes the second layer as a second layer of electrically relatively non-conductive, relatively high molecular weight, relatively low density *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 4, lines 50-63 embodiment as high voltage insulation of *EPR*. Appellant's claim 10 describes the second layer as a second layer of electrically relatively non-conductive, relatively high molecular weight, relatively low density *polyethylene*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and*

*two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as high voltage insulation of *EPR*. Appellant's claim 10 describes the second layer as a second layer of electrically relatively non-conductive, relatively high molecular weight, relatively low density *polyethylene*. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's claim 10 describes the third layer as a third layer of an electrically relatively non-insulative *polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 5, lines 41-48 embodiment as high voltage insulation of unspecified material. Appellant's claim 10 describes the second layer as a second layer of electrically relatively non-conductive, relatively high molecular weight, relatively low density polyethylene. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's claim 10 describes the fourth layer as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 10 describes the core as a *fiber* core. Dinzen describes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 10 describes the second layer as a second layer of *electrically relatively non-conductive*, relatively high molecular weight, relatively low density polyethylene.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 10 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as a *carbon-loaded* polyethylene *layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 10 describes the second layer as a second layer of *electrically relatively non-conductive*, relatively high molecular weight, relatively low density polyethylene. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 10 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### **Claim 11**

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 30-49 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 5, lines 41-48 embodiment as a *conducting sleeve*. Appellant's third layer is described as a third layer of electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 11 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*.

Appellant's claim 11 describes the second layer as including an *electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 11 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as a *carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 11 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 11 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### Claim 12

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative polyvinyl chloride. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 30-49 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative polyvinyl chloride.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen describes the third layer of

Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 5, lines 41-48 embodiment as *a conducting sleeve*. Appellant's third layer is described as a third layer of spirally extruded, electrically relatively non-insulative *polyvinyl chloride*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 12 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 12 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 12 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 12 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 12 describes the third layer as a third layer of spirally extruded, *electrically relatively non-insulative* polyvinyl chloride.

### Claim 13

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col.

4, lines 30-49 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 embodiment as a conducting sleeve of semiconducting *rubber*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 5, lines 41-48 embodiment as *a conducting sleeve*. Appellant's third layer is described as a third layer of *spirally extruded, electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 13 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 13 describes the second layer as including an *electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 13 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 13 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath.

Appellant's claim 13 describes the third layer as a third layer of spirally extruded, *electrically relatively non-insulative* polymer. All emphasis Appellant's.

#### Claim 14

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as "a fourth layer including a *copper-containing braid shield*."

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 14 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 14 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 14 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 14 describes the core as a *fiber core*. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's fourth layer is described as a fourth layer including a *copper-containing braid shield*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 14 describes the core as a *fiber core*. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 14 describes the second layer as including an *electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 14 describes the first layer as a first layer of an electrically

relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 14 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric sheath*. Appellant's claim 14 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.

### Claim 15

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *copper- and tin-containing braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 15 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 30-49 embodiment as a conductor of braided copper wires. Appellant's claim 15 describes the fourth layer as a fourth layer including a *copper- and tin-containing braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 15 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 embodiment as a conductor of braided copper wires. Appellant's claim 15 describes the fourth layer as a fourth layer including a *copper- and tin-containing braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 15 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer*. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a screen braid of *copper wires*. Appellant's claim 15 describes the fourth layer as a fourth layer including a *copper- and tin-*

containing braid shield.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 15 describes the core as a *fiber core.* Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor.* Appellant's fourth layer is described as a fourth layer including a *copper- and tin-containing braid shield.*

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 15 describes the core as a *fiber core.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor.* Appellant's claim 15 describes the second layer as including an *electrically relatively non-conductive polymer.*

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 15 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as a *carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 15 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 15 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. Hastings '935 describes the fourth layer as an electrically grounded *conductive braid* layer or sheath. Appellant's fourth layer is described as a fourth layer including a *copper- and tin-containing braid shield.*

### Claim 16

Hastings '827 describes his third layer as an electrically grounded *conductive braid.* Appellant's third layer is described as a third layer of an electrically relatively *non-insulative polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *tin-containing braid shield.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 16 describes the core as a *fiber core.* Dinzen describes the fourth layer of Dinzen's col.

4, lines 30-49 embodiment as a conductor of braided *copper* wires. Appellant's claim 16 describes the fourth layer as a fourth layer including a *tin-containing braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as *a core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 16 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 embodiment as a conductor of braided copper wires. Appellant's claim 16 describes the fourth layer as a fourth layer including a *tin-containing braid* shield.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 16 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer*. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a screen braid of *copper* wires. Appellant's claim 16 describes the fourth layer as a fourth layer including a *tin-containing braid* shield.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 16 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's fourth layer is described as a fourth layer including a *tin-containing braid* shield.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 16 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a high voltage *conductor*. Appellant's claim 16 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 16 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm*. Appellant's claim 16 describes the second layer as a second layer of an electrically relatively

*non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 16 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. Hastings '935 describes the fourth layer as an electrically grounded *conductive braid* layer or sheath. Appellant's fourth layer is described as a fourth layer including a *tin-containing braid* shield.

### Claim 17

Hastings '827 describes his third layer as an electrically grounded *conductive braid*. Appellant's third layer is described as a third layer of an electrically *relatively non-insulative polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 17 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 30-49 embodiment as a conductor of braided *copper* wires. Appellant's claim 17 describes the fourth layer as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 17 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 embodiment as a conductor of braided copper wires. Appellant's claim 17 describes the fourth layer as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 17 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated* band. Appellant's third layer is described as a third layer of an

*electrically relatively non-insulative polymer.* Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a screen braid of copper wires. Appellant's claim 17 describes the fourth layer as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer* of electrically relatively non-insulative polymer.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 17 describes the core as a *fiber core.* Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor.* Appellant's fourth layer is described as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer* of electrically relatively non-insulative polymer.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 17 describes the core as a *fiber core.* Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor.* Appellant's claim 17 describes the second layer as including an *electrically relatively non-conductive polymer.*

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 17 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as a *carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 17 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 17 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. Hastings '935 describes the fourth layer as an electrically grounded *conductive braid* layer or sheath. Appellant's fourth layer is described as a fourth layer including a metal braid *covering between about 85% and about 100% of the outside surface of the third layer* of electrically relatively non-insulative polymer. All emphasis Appellant's.

### Claim 18

Hastings '827 describes his third layer as an electrically grounded *conductive braid.* Appellant's third layer is described as a third layer of an electrically relatively *non-insulative polymer.* Hastings '827 fourth layer is described as a lapped layer of *polyester*

*sheet material. Appellant's fourth layer is described as a fourth layer including a metal braid shield, the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.*

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 18 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 30-49 embodiment as a conductor of braided *copper* wires. Appellant's claim 18 describes the fourth layer as a fourth layer including a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 18 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 embodiment as a conductor of braided copper wires. Appellant's claim 18 describes the fourth layer as a fourth layer including a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 18 describes the core as a *fiber* core. Dinzen describes the third layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a conductive sleeve of *semiconducting coated band*. Appellant's third layer is described as a third layer of an *electrically relatively non-insulative polymer*. Dinzen describes the fourth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a screen braid of copper wires. Appellant's claim 18 describes the fourth layer as a fourth layer including a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 18 describes the core as a *fiber* core. Dinzen describes the fourth layer of Dinzen's col. 5, lines 41-48 embodiment as a *conductor*. Appellant's fourth layer is described as a fourth layer including

a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.*

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 18 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor.* Appellant's claim 18 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 18 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 18 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 18 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer. Hastings '935 describes the fourth layer as an electrically grounded *conductive braid* layer or sheath. Appellant's fourth layer is described as a fourth layer including a metal braid shield, *the pitch of the braid of the metal braid shield being between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.*

### Claim 19

Hastings '827 describes his third layer as an electrically grounded conductive *braid*. Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen describes the fifth layer of Dinzen's col. 4, lines 30-49 embodiment as a casing of *polyvinyl chloride* (PVC). Appellant's claim 19 describes the fifth layer as a fifth layer including a relatively solvent- and abrasive-resistant flexible *polyurethane* jacket.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 embodiment as a

*core including a copper wire surrounded by six nickel-iron alloy wires.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen describes the fifth layer of Dinzen's col. 4, lines 50-63 embodiment as a casing of *PVC*. Appellant's claim 19 describes the fifth layer as a fifth layer including a relatively solvent- and abrasive-resistant flexible *polyurethane* jacket.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as *a core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen describes the fifth layer of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a casing of *PVC*. Appellant's claim 19 describes the fifth layer as a fifth layer including a relatively solvent- and abrasive-resistant flexible *polyurethane* jacket.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as *a high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen describes the fifth layer of Dinzen's col. 5, lines 41-48 embodiment as a casing. Appellant's claim 19 describes the fifth layer as a fifth layer including a relatively solvent- and abrasive-resistant flexible *polyurethane* jacket.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as *a conductor having a core provided with two heating conductors and one heat control conductor.* Appellant's claim 19 describes the core as a *fiber* core. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 19 describes the second layer as including an *electrically relatively non-conductive* polymer.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 19 describes the first layer as a first layer of an *electrically relatively non-insulative* polymer. Hastings '935 describes the second layer as *a carbon-loaded polyethylene layer having a resistivity of 10<sup>6</sup>-10<sup>8</sup> ohm-cm, preferably 10<sup>7</sup> ohm-cm.* Appellant's claim 19 describes the second layer as a second layer of an *electrically relatively non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric* sheath. Appellant's claim 19 describes the third layer as a third layer of an *electrically relatively non-insulative* polymer.

### **Claim 20**

Hastings '827 describes his third layer as an *electrically grounded conductive*

*braid.* Appellant's third layer is described as a third layer of an electrically relatively non-insulative *polymer*. Hastings '827 fourth layer is described as a lapped layer of *polyester sheet* material. Appellant's fourth layer is described as a fourth layer including a *metal braid shield*.

Dinzen describes the core of Dinzen's col. 4, lines 30-49 embodiment as a core in the form of a *synthetic plastic string surrounded by six stranding elements each including a core wire and a layer of six steel wires stranded to form a cord*. Appellant's claim 20 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63) embodiment as a *core including a copper wire surrounded by six nickel-iron alloy wires*. Appellant's claim 20 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 4, lines 50-63 and col. 5, lines 59-62 embodiment as a *core having two bare high voltage conductors of Ni-Fe alloy wires and two insulated heating conductors of Ni-Fe alloy wire with insulation, all stranded together*. Appellant's claim 20 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 5, lines 41-48 embodiment as a *high voltage conductor including a first heating conductor, an insulation, a second heating conductor, an insulation, and a high voltage conductor*. Appellant's claim 20 describes the core as a *fiber core*.

Dinzen describes the core of Dinzen's col. 5, lines 55-59 embodiment as a *conductor having a core provided with two heating conductors and one heat control conductor*. Appellant's claim 20 describes the core as a *fiber core*. Dinzen also characterizes the second layer of Dinzen's col. 5, lines 55-59 embodiment as a *high voltage conductor*. Appellant's claim 20 describes the second layer as including an *electrically relatively non-conductive polymer*.

Hastings '935 describes the first layer as spirally wound *insulative* thread or ribbon. Appellant's claim 20 describes the first layer as a first layer of an electrically relatively *non-insulative* polymer. Hastings '935 describes the second layer as a *carbon-loaded polyethylene layer having a resistivity of  $10^6$ - $10^8$  ohm-cm, preferably  $10^7$  ohm-cm*. Appellant's claim 20 describes the second layer as a second layer of an electrically relatively *non-conductive* polymer. Hastings '935 describes the third layer as a *dielectric sheath*. Appellant's claim 20 describes the third layer as a third layer of an electrically *relatively non-insulative* polymer.



### Summary and Conclusion

Again, by Appellant's rough calculations, there are seventy-two hundred different high voltage cable configurations that can be made up from among these choices. Appellant submits that it is the antithesis of 35 U. S. C. § 103 obviousness to arrive at the combinations claimed in Appellant's claims 1-20 from the combinations described in Hastings '827, Dinzen and Hastings '935.

Accordingly, Appellant submits that the final rejection of his claims 1-20 is erroneous and should be reversed. Such action is respectfully requested.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Richard D. Conard".

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### The Claims On Appeal

1. A high voltage cable including a fiber core, a first layer of an electrically relatively non-insulative polymer, a second layer of an electrically relatively non-conductive polymer, a third layer of an electrically relatively non-insulative polymer, a fourth layer including a metal braid shield, and a fifth layer including a relatively solvent- and abrasive-resistant polymer jacket.

2. The cable of claim 1 wherein the fiber core includes a stranded fiber polyester core.

3. The cable of claim 2 wherein the fiber core is impregnated to increase its bulk conductivity.

4. The cable of claim 3 wherein the fiber core is impregnated with carbon black.

5. The cable of claim 1 wherein the fiber core is impregnated to increase its bulk conductivity.

6. The cable of claim 5 wherein the fiber core is impregnated with carbon black.

7. The cable of claim 1 wherein the first layer includes a layer of semiconductive polyethylene.

8. The cable of claim 7 wherein the layer of semiconductive polyethylene includes a layer of carbon black-loaded polyethylene.

9. The cable of claim 1 wherein the second layer includes a layer of electrically relatively non-conductive polyethylene.

10. The cable of claim 9 wherein the layer of electrically relatively non-conductive polyethylene includes a layer of relatively high molecular weight, relatively low density polyethylene.

11. The cable of claim 1 wherein the third layer includes a layer of electrically relatively non-insulative polyvinyl chloride.

12. The cable of claim 11 wherein the layer of electrically relatively non-insulative polyvinyl chloride includes a layer of spirally extruded electrically relatively non-insulative polyvinyl chloride.

13. The cable of claim 1 wherein the third layer includes a layer of spirally extruded electrically relatively non-insulative polymer.

14. The cable of claim 1 wherein the metal braid shield includes a copper-containing braid shield.

15. The cable of claim 14 wherein the copper-containing braid shield further contains tin.

16. The cable of claim 1 wherein the metal braid shield includes a tin-containing braid shield.

17. The cable of claim 1 wherein the metal braid shield includes a metal braid covering between about 85% and about 100% of the outside surface of the third layer of electrically relatively non-insulative polymer.

18. The cable of claim 1 wherein the pitch of the braid of the metal braid shield is between about 0° and about 20° to a perpendicular to the longitudinal extent of the cable.

19. The cable of claim 1 wherein the polymer jacket includes a flexible polyurethane jacket.

20. The cable of claim 1 in combination with a high magnitude electrostatic potential supply, a device for the electrostatically aided atomization and dispensing of a coating material, a source of the coating material coupled to the device, the high voltage cable coupling the potential supply to the device.